

Remarks/Arguments

I. Status of the Claims

In the Office Action, the Examiner indicated that claims 1-18, 35 and 36 are pending and rejected claims 1-18, 35 and 36 under 35 U.S.C. §102(e) and/or 35 U.S.C. §103(a).

Claims 19-34 and 37-39 were previously canceled in light of a restriction requirement.

Claims 1-18, 35 and 36 are pending for reconsideration.

II. Objection to the Disclosure

At page 2, item 1 of the Office Action, the disclosure is objected to because of an informality, i.e., the serial number of a referenced copending patent application was left blank. To correct this informality, the disclosure is amended herein to replace the blank spaces at page 5, line 18 with the serial number of the referenced copending patent application.

Therefore, the Applicants respectfully request reconsideration and withdrawal of the objection to the disclosure.

III. Rejection of Claims 1-3, 8, 11-12 and 35-36 under 35 U.S.C. §102(e)

At pages 2-3, item 3 of the Office Action, claims 1-3, 8, 11-12 and 35-36 are rejected under 35 U.S.C. §102(e) as being anticipated by Hartog et al. (U.S. Patent No. 6,236,542).

This rejection is respectfully traversed to the extent that it is maintained. A proper rejection under 35 U.S.C. §102 requires that the reference disclose each and every claim element as set forth in the claims. As discussed below, however, the Hartog et al. patent fails to disclose (or even suggest) the claimed invention.

For example, the Hartog et al. patent fails to disclose (or even suggest) a self-cleaning colloidal slurry composition having “a surfactant adsorbed and/or precipitated onto a surface of at least one of the substrate and the colloidal particles, the surfactant having a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles” as recited in each of the independent claims, i.e., claims 1 and 35. That is, the Hartog et al patent does not disclose (or even suggest) including a surfactant in the colloidal slurry composition that forms a steric hindrance barrier between the colloidal particles and substrate surface. The existence of the steric hindrance barrier goes to the heart of the present invention -- the steric hindrance barrier permits removal of substantially all of the remaining contamination from the surface of the substrate using standard soap solutions.

The conventional superfinishing polish process and slurry described in the Hartog et al. patent, and the problems associated therewith, are discussed in the Background section of the present application. See, for example, the discussion at page 4, lines 1-19 of the present application. In the conventional superfinishing polish process and slurry of the Hartog et al. patent, colloidal silica particles attach to the surface being polished not

only by the usual London dispersion forces, van der Waals forces and hydrogen bonding, but unlike NiP, also by molecular bonding even though the slurry has the usual stabilizing agents used in the colloidal silica to prevent the silica particles from sticking to each other (interparticle siloxane bonding), charge repulsion and/or steric stabilizers. Standard methods of scrubbing with soaps using polyvinyl alcohol (PVA) pads, ultrasonics or megasonics will not remove any significant percentage of such molecular bonded silica particles. Just as with aluminum-based substrates, if these particles are left in place on the glass substrate, glide defects occur that can ultimately cause disk drive failure. These glide defects further cause magnetic defects, corrosion and decreased disk life.

In this regard, the rejection states, "Hartog et al also disclose that the polishing composition includes organic or inorganic agents for stabilizing the colloidal particles in the slurry by providing steric hindrance to maintain dispersion of the colloidal particles, which reads on the claimed surfactant (col. 6, lines 45-53)." The Applicants respectfully disagree because the stabilizers referred to in the rejection do not form a steric hindrance barrier between the substrate and the colloidal particles as required by independent claims 1 and 35 of the present application. Rather, the stabilizers referred to in the rejection enhance the electrical double layer charge and/or provide steric hindrance to maintain dispersion of the colloidal particles, i.e., the stabilizers prevent enough polymerization that the slurry can be used as a polishing fluid pumped through lines and large pore (3 microns) filters to the polishing pad, without thickening to the point where the slurry can not be so used. The section of the Hartog et al. patent referred to by the Examiner states,

Since colloids are thermodynamically unstable, the method for stabilizing slurry 500 is important. In a manufacturing environment, slurry 500 must remain stable while circulating through the 3 micron filter. In the preferred embodiment, this is accomplished by using organic or inorganic agents to enhance the electrical double layer charge and/or provide steric hindrance to maintain dispersion of the colloidal particles.

The stabilizers referred to in the rejection do not form a steric hindrance barrier between the substrate and the colloidal particles as required by independent claims 1 and 35 of the present application. This deficiency in the superfinish slurry of the Hartog et al. patent is also discussed in the Detailed Description of the Preferred Embodiments section of the present application. See, for example, the discussion at page 25, line 20 - 26, line 9 of the present application relative to stabilization agents in the conventional superfinish slurry of the Hartog et al. patent. When the conventional superfinish slurry of the Hartog et al. patent is made by acidifying the colloidal silica, the stabilizers do not prevent some interparticle siloxane bonding (particles sticking to each other) and thus also bonding subsequently to the glass substrate during polish. This is due to the reduction in thickness of the ionic double layer caused by increased solution ionic content with the addition of acid. They do prevent enough polymerization that the slurry does not thicken so much it can not be used as a polishing fluid pumped through lines and large pore (3 microns) filters to the polishing pad. The organic surfactants forming the steric hindrance barrier of the present invention do not stabilize the colloidal dispersion but form a steric hindrance layer between the colloidal silica and the glass disk substrate surface.

Claims 2-3, 8 and 11-12; and 36 depend, directly or indirectly, from independent claims 1 and 35, respectively, and set forth all of the limitations therein. For at least the reasons discussed above with respect to independent claims 1 and 35, the Applicants respectfully submit that dependent claims 2-3, 8 and 11-12; and 36 also patentably define over the prior art.

Therefore, the Applicants respectfully request reconsideration and withdrawal of this rejection of claims 1-3, 8, 11-12 and 35-36 under §102(e).

IV. Rejections of Claims 4-10 and 13-18 under 35 U.S.C. §103(a)

At page 4, item 6 of the Office Action, claims 4-6, 9-10 and 13-18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hartog et al. (U.S. Patent No. 6,236,542) in view of Labib et al. (U.S. Patent No. 6,454,871).

At pages 4-5, item 7 of the Office Action, claims 7-8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hartog et al. (U.S. Patent No. 6,236,542) in view of Small et al. (U.S. Patent No. 6,251,150).

These rejections are respectfully traversed to the extent that they are maintained. Claims 4-10 and 13-18 depend, directly or indirectly, from independent claim 1, and set forth all of the limitations therein. As discussed in Section III above, the Hartog et al. patent fails to disclose or suggest a self-cleaning colloidal slurry composition having “a surfactant adsorbed and/or precipitated onto a surface of at least one of the substrate and the colloidal particles, the surfactant having a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles” as recited in independent claim 1 (from which claims 4-10 and 13-18 depend, directly or indirectly). This deficiency in the primary reference to Hartog et al. is not cured by the secondary references to Labib et al and Small et al. The secondary reference to Labib et al. is cited for allegedly teaching “a cleaning composition includes surfactant for easily removing particles or residue with the help of steric effect and which surfactant can be anionic, cationic or nonionic (col. 15, lines 3-22).” The secondary reference to Small et al. is cited for allegedly teaching “a composition comprises colloidal particles of silica or alumina (aluminum oxide) having a pH of about 3.8-9.4 for maintaining the zeta potential of the slurry composition in order clean or remove the residue efficiently (col. 10, lines 8-15, col. 10, lines 48-51 and col. 11, lines 4-7).” These secondary references, however, fail to cure the deficiency in the primary reference to Hartog et al. That is, the Hartog et al.,

Labib et al. and Small et al. patents, alone and in combination, fail to disclose or suggest a self-cleaning colloidal slurry composition having "a surfactant adsorbed and/or precipitated onto a surface of at least one of the substrate and the colloidal particles, the surfactant having a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles" as recited in independent claim 1 (from which claims 4-10 and 13-18 depend, directly or indirectly). Therefore, the Applicants respectfully submit that dependent claims 4-10 and 13-18 also patentably define over the prior art.

Therefore, the Applicants respectfully request reconsideration and withdrawal of these rejections of claims 4-10 and 13-18 under §103(a).

V. Conclusion

In view of the foregoing comments, the Applicants respectfully submit that all of the pending claims (i.e., claims 1-18, 35 and 36) are in condition for allowance and that the application should be passed to issue.

If a conference would be of value in expediting the prosecution of this application, the Examiner is hereby invited to telephone the undersigned counsel at (540) 785-6578 to arrange for such a conference.

Respectfully submitted,

By: 

Matthew J. Bussan
Registration No.: 33,614
8308 Canteen Circle
Fredericksburg VA 22407

Telephone: (540) 785-6578
Fax No.: (540) 785-6578